Glenn Interim Directive

GLID 8000.1

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COMPLIANCE IS MANDATORY

Responsible Office: Code Q/ Safety and Mission Assurance Directorate

Risk Management

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Change History

Change	Date	Description/Comments
Basic	10/15/2012	This document contains the requirements on the implementing organization for performing, supporting, and evaluating the risk management provisions in accordance with NPD 7120.4, NPR 7120.5, NPR 8000.4, NPR 7120.7, NPR 7120.8, and NPR 8820.2.

Preface

P.1 Purpose

a. The purpose of this Glenn Interim Directive (GLID) document is to establish the requirements on the implementing organization for performing, supporting, and evaluating the risk management provisions of the NASA Policy Directive (NPD) 7120.4 Program/Project Management, the NASA Procedural Requirements (NPR) 7120.5 NASA Program and Project Management Processes and Requirements, the NPR 8000.4 Agency Risk Management Procedural Requirements, NPR 7120.7 NASA Information Technology and Institutional Infrastructure Program and Project Management Requirements, NPR 7120.8 NASA Research and Technology Program and Project Management Requirements, and NPR 8820.2 Facility Project Requirements.

b. Projects in the context of this document are defined as a specific investment having defined goals, objectives, requirements, life-cycle cost, a beginning, and an end. A project yields new or revised products or services that directly address NASA's strategic needs. They may be performed wholly in-house; by Government, industry, academia partnerships; or through contracts with private industry. Projects in the context of this document is defined as any organized effort with a Glenn Research Center (GRC) assigned project manager.

c. This GLPR establishes requirements leading to a risk management approach that is coherent across the Center and achieves appropriate coverage of risks within NASA as well as NASA GRC.

P.2 Applicability

a. This procedure establishes the risk management formulation and implementation at GRC. This process is applied to all GRC programs, projects, and subprojects that provide aerospace products or capabilities (i.e., flight and ground systems, equipment/operations, advanced technology development (ATD) programs/projects directly funded by flight systems and ground support programs/projects, or ATD programs/projects with outcomes directly tied to space flight mission success and schedule, Information systems and technology projects, institutional projects, component facilities, new and existing programs that provide aeronautics capabilities, i.e., technologies, and operations for aeronautics, technology, research and analysis, and operations (test and computational)) for space and aeronautics products. This includes when the project effort is contracted, when the project is a shared responsibility of GRC and a partner, as well as projects performed “in-house”. The only exception would be if there is a governing program risk management plan/process in place from another Center to which GRC has shared responsibility. It is not required, but may be used for activities such as nonflight infrastructure, Construction of facilities, and small business innovation research (SBIR) projects.

b. This GLID is applicable to all organizations at GRC Lewis Field and the Plum Brook Station. The GRC organizations may establish their own implementation plans as long as they meet the requirements outlined in this document. An organizational unit is refers to a program, project, institutional, directorate, divisional, or branch organization.

c. This GLID applies to all GRC organizations concerned with achieving and demonstrating sound occupational health and safety performance by controlling their risks per Occupational Health and Safety Assessment Specification (OHSAS) 18001:2008.

d. This GLID applies to all activities (such as programmatic, research, institutional [including occupational health and safety], or selecting suppliers), which will have risks in some way that could impact safety, cost, schedule, performance, and management at NASA GRC.

e. This GLID applies to any items (e.g., functions, parts, software, characteristics, processes) having significant effect on the product realization and use of the product, including safety, performance, form, fit, function, producibility, service life, etc, that requires specific actions to ensure they are adequately managed. This GLPR should take into account routine and nonroutine activities and any changes or proposed changes in an organization, its activities, or materials.

P.3 Authority

a. NPD 7120.4 Program/Project Management

b. NPR 7120.5, "NASA Space Flight Program/Project Management Requirements"

c. NPR 7120.7, "NASA Information Technology and Institutional Infrastructure Program and Project Management Requirements"

d. NPR 7120.8, "NASA Research and Technology Program and Project Management Requirements"

e. NPR 7123.1, "Systems Engineering Processes and Requirements"

f. NPR 8000.4, "Agency Risk Management Procedural Requirements"

g. NPR 8820.2, "Facility Project Requirements"

P.4 Applicable Documents and Forms

a. OHSAS 18001:2008, "Occupational Health and Safety Management Systems – Requirements

b. Rehabilitation Act, Section 508 "Requirements"

c. GLPR 1270.1, "Corrective and Preventive Action"

d. GLPR 8730.5, Glenn Research Center Business Management System (BMS) Quality System Manual"

e. Glenn Work Instruction (GLWI) 9980.1, "Internal Audit Work Instruction"

P.5 Measurement/Verification

a. The Safety and Mission Assurance Directorate (SMAD) conducts annual assessments of programs/projects and institutional/facilities/directorates to verify compliance with this document. Compliance will be determined by reviewing the archived artifacts required by this procedure.

b. Programs/projects and institutional/facilities/directorates should provide comments/feedback to the SMAD in accordance with GLPR 1270.1 for future updates.

c. Independent Internal and External Audits of this procedure are also performed as part of the overall GRC BMS quality system process per GLPR 8730.5.

P.6 Cancellation

None.

/S/
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CHAPTER 1. Introduction

1.1 Introduction

1.1.1 Risk Management

a. Risk management is a set of activities aimed at achieving success by proactively risk-informing the selection of decision alternatives and then managing the implementation risks associated with the selected alternative. Per NPR 8000.4A, risk management is defined in terms of Risk Informed Decision Making (RIDM) and Continuous Risk Management (CRM). The document addresses the application of these processes to the safety, technical, cost, and schedule mission execution domains throughout the life cycle of programs and projects, including acquisition. In addition, institutional risks and the coordination of risk management activities across organizational units are addressed.

b. The purpose of integrating RIDM and CRM into a coherent framework is to foster proactive risk management to better inform decision making through better use of risk information, and then to more effectively manage implementation risks using the CRM process, which is focused on the baseline performance requirements emerging from the RIDM process. Within an RIDM process, decisions are made with regard to outcomes of the decision alternatives, taking into account applicable risks and uncertainties; then, as part of the implementation process, CRM is used to manage those risks in order to achieve the performance levels that drove the selection of a particular alternative. Proactive risk management applies to programs, projects, and institutional or mission support offices.

1.1.2 Risk Informed Decision Making (RIDM)

a. The RDIM incorporates risk analysis in the design and formulation of the program baseline. The process of RIDM considers diverse performance measures (PM), which characterizes the performance a system, process, or activity in fulfilling its intended objectives. (PMs may relate to system, mission, safety, or cost performances.) RIDM advocates: top-down and integrated modeling of PMs; consideration of uncertainties in risk characterization and acceptance; and deliberation to address issues that have not been captured by the formal analysis.

b. The RIDM manages threats to satisfaction of baseline performance requirements by assessing risk associated with implementation of the selected alternative; assisting in setting resource priorities (including prioritization of work to resolve uncertainties if warranted); plan, track, and control risk during the implementation of the selected alternative; and iterate with previous steps in light of new information

1.1.3 Continuous Risk Management (CRM)

a. The CRM is an organized, systematic decision-making process that efficiently and effectively identifies, analyzes, plans (for the handling of risks), tracks, controls, communicates, and documents risk to increase the likelihood of achieving program/project goals.

b. Risk management (RM) is a continuous, iterative process to manage risk and should be an integral part of normal program/project management and engineering processes.
c. The CRM provides a disciplined environment for proactive decision making to:

(1) Assess continually what could go wrong (risks)

(2) Determine which risks are important to deal with

(3) Implement strategies to deal with those risks

(4) Assure and measure the effectiveness of the implemented strategies (or mitigations)

1.1.4 RIDM and CRM

Both CRM and RIDM are applied within a graded approach. The resources and depth of analysis need to be commensurate with the stakes and the complexity of the decision situations being addressed. For example, the level of rigor needed in risk analysis to demonstrate satisfaction of safety-related performance requirements depends on specific characteristics of the situation: how stringent the requirements are, how complex and diverse the hazards are, and how large the uncertainties are compared to operating margin, among other things. Both RIDM and CRM are formulated to allow for this.

1.1.5 Institutional Risks

The management of institutional risks affecting multiple programs/projects is carried out within Center support hierarchy and coordinated with the program/project offices as needed. Since the program/project offices are affected by institutional risks without being in a position to manage them proactively, in the event that institutional risks threaten accomplishment of program/project office performance requirements, the program/project office need either to manage those risks with their own resources or elevate them to the next level within the program/project hierarchy.

1.2 Records

1.2.1 Records Management

a. Each project is required to establish and maintain a repository of project records and products accessible by project staff and other appropriate project stakeholders.

b. Each project shall include the following RM artifacts in this repository:

(1) Risk Management Plan (RMP)

(2) Risk database (risk list, acceptance/closure rationale, status)

(3) Risk board records

1.2.2 Inputs

The risk management process begins with risk identification and an assessment of organizational/program/project constraints, which defines acceptable risks. Examples include, but are not limited to mission success criteria; development schedule; budget limits; critical single source suppliers; security or environmental concerns; "fail ops/fail safe" requirements; facilities and infrastructure limitations; technology readiness; surveillance requirements; selecting and using suppliers; occupational health and safety performance; and amount and type of testing.

1.2.3 Outputs

A representative list of risk management output documentation is provided in Section 1.2.1, Records Management.

1.2.4 Metrics Used to Measure Process Effectiveness

a. Metrics, such as predictive, diagnostic, or retrospective, shall be gathered for this process to indicate the effectiveness of this process and provide direction to which processes should be improved.

(1) Predictive metrics are forward-looking, based on expectations. Examples of predictive metrics include: number of risks identified, survey-based risk assessment, aggregated overall schedule risk, or activity cost estimates compared with worst-case resource estimates.

(2) Diagnostic metrics are drawn from current project status, throughout the work. Examples include: number and magnitude of approved scope changes, key milestones missed, risks added after project baseline setting, and risk closure index.

(3) Retrospective metrics are backward-looking, derived from results. Examples of retrospective metrics include: actual durations compared to planned schedule, number of missed major milestones, cumulative overtime, and the number of new unplanned activities.

b. The SMAD gathers metrics and will use the metrics to identify areas of improvement as well as monitoring the health of the risk management process at GRC.

CHAPTER 2. Responsibilities

2.1 Safety and Mission Assurance Directorate (SMAD)

2.1.2 The SMAD is responsible to the GRC Director and to the NASA Chief Safety and Mission Assurance Officer to provide independent assessment of organizational/institutional/program/project/subproject risk planning and implementation activities. The SMAD (Code Q) may also perform assessments on behalf of the Engineering Management Council (EMC) or other management authority. Periodically, the Code Q in conjunction with the GRC Center auditor, will conduct audits (GLWI 9980.1) of the risk management process to ensure:

a. Compliance with submitted plans, which are periodically reviewed for effectiveness and milestone progress

b. Effective horizontal and vertical integration of risk mitigation activities/processes throughout the relevant organization elements.

2.1.3 The SMAD support to the program/project/subproject/facility/institutional unit may include:

a. Facilitating high-level managers in making decisions on significant risk issues, including subordinate and common level risk issues.

b. Assuring applicable personnel (both Government and contractor) within the organizational element are provided proper risk management training.

c. Reviewing and assessing the effectiveness of the risk management process and provide recommendations for improvement.

d. Performing integrated data analysis activities to help guide Center Management decisions.

2.1.4 SMAD Support Activities

a. The SMAD shall also support the organizational/institutional/program/project/subproject in the development and implementation of risk management methods, techniques, and tools.

b. The SMAD support to the organizational/institutional/program/project/subproject shall include:

(1) Assisting with developing, implementing, and updating the Risk Management Plan (RMP).

(2) Reviewing risk statements to ensure they are written in a condition/consequence format.

(3) Providing guidance on estimating the likelihood, consequences, and timeframe of the risk.

(4) Reviewing the risk mitigations to ensure the mitigation will actually reduce the likelihood and consequence of the risk occurring.

(5) Assuring risks are tracked and used to measure the progress of the risk management program.

(6) Monitoring risk closures and reporting.

(7) Assuring their respective risk information is documented in the appropriate risk database and kept current. (Suggest using the Risk Management Implementation Tool (RMIT).

(8) Facilitating high-level managers in making decisions on significant risk issues, including subordinate and common level risk issues.

(9) Assuring applicable personnel (both Government and contractor) within the organizational element are provided proper risk management training.

(10) Ensuring the organizational/institutional/program/project/subproject is adhering to a CRM process.

(11) Conducting CRM training and risk identification workshops.

(12) Reviewing and assessing the effectiveness of the risk management process and provide recommendations for improvement.

2.2 Program/Project/Subproject Management

2.2.1 Each program, project, and subproject at the GRC shall develop an RMP in accordance with the provisions of NPR 7123.1, and NPR 8000.4. if there is not a governing risk management plan available. When a program/project is not GRC-resident and wishes to follow a higher-level program risk management plan, the project management plan should capture the deviation and point to the correct governing program risk management plan. Organizations such as occupational safety and health or directorates, will not be required to prepare a risk management plan.

2.2.2 The RMP shall be developed during the formulation phase, approved by the program, project, or subproject manager, and executed/maintained during the implementation phase. The RMP should include a summary of how the program will implement the NASA risk management process (including RIDM and CRM in accordance with NPR 8000.4, Agency Risk Management Procedural Requirements. The RMP should also include the initial significant risk list and appropriate actions to mitigate each risk.

2.2.3 Each program, project, and subproject manager is responsible for the successful implementation of the CRM process. The project manager is responsible for the following: providing project risk status, especially concerning primary risks, to the program manager, Center Director, EMC, or governing management council, as appropriate.

2.2.4 Other Program/Project/Subproject Support Activities

Organizations or activities which support the development, implementation, and execution of a program, project, or subproject may aid in the identification, analysis, planning, tracking, and control of specific threats and in the preparation and execution of the RMP, as required by the authority and reference documents. These organizations may include engineering, resource and financial management, acquisition, facilities management, and others providing technical and administrative support, as requested by organizational/institutional/program/project/subproject management.

2.3 GRC Directorate Level Governance Boards/Councils

2.3.1 The GRC directorate level governance boards/councils evaluate how the Center executes its projects research and technology activities, safety, and engineering services in a manner that meets the strategic investment strategies and goals of the center and of the Agency. Each primary council chair will:

a. Review the status of the risk management efforts during the regular review of the program/project progress.

b. Approve or reject recommendations for top programmatic risks.

c. Provide final approval on risk acceptance or closure for top programmatic risks by authorizing requested resources, concurring on closure rationale, or accepting the risk with no further expenditure of resources.

d. Authorizes the transfer of program identified risk by the Center to the appropriate program/project.

e. Elevates top programmatic risks to the Mission Support Council/Center Management Council level, as required.

2.3.2 Engineering Management Council (EMC)

The EMC shall review the status of the risk management efforts during the regular review of the program/project/subproject progress. The program/project/subproject adherence to planned risk identification, analysis, and tracking activities will be evaluated, appropriate remedial actions will be levied, and the confidence reviewers attain in the risk management process will be a consideration in funding, progress, and termination review deliberations.

CHAPTER 3. Procedure

3.1 General Requirements

3.1.1 The NPR 7120.5 "NASA Program and Project Management Processes and Requirements" and NPR 7120.8 "NASA Research and Technology Program and Project Management Requirements" provides the basic RM requirements that are applicable to all programs and projects while NPR 8000.4 establishes the framework for conducting risk management across programmatic, financial, and institutional activities. These documents require that each NASA program and project will develop and operate, plan and execute using risk management decision processes. The program or project is required to implement a plan to mitigate, close, or accept each risk in the most resource-effective manner, based on its impact on the program or project mission's objectives.

3.1.2 Each project that provides aerospace products and capabilities (i.e., space, aeronautics, flight and ground systems, technology, research and analysis, and operations [test and computational] and any component facilities and institutional operations at GRC shall address and implement CRM. The CRM is not required but may be used for activities such as nonflight infrastructure, CoF, and SBIR projects.)

3.1.3 Risk management for the various projects at GRC involves two steps: Initial risk management training for the project team, and then implementation. The methodology of this training and implementation may be unique and tailored for each project at the discretion of the Reliability and Systems Safety Engineering Branch (Code QER).

3.2 Initial Risk Management Training

The Program and Project Assurance Division offers three training courses, which serve to impart a methodology that satisfies the NASA requirement for implementing risk management. A project should use risk management training to build team work. Risk management training involves personnel at all levels of the project; focuses their attention on a shared product vision, and provides a mechanism for achieving the project's mission objectives.

3.3 Implementation

The Project shall do risk management as part of their program management. Implementation of CRM is required by NPR 7120.5, NPR 7120.8, and NPR 8000.4 and involves six fundamental steps, as discussed below. Each project shall define and implement a means of accomplishing each of the six steps. The Reliability and Systems Safety Engineering Branch (Code QER) is chartered to provide a wide range of technical assistance in the CRM process, from consultation/facilitation to extensive training and implementation activities.

3.4 Identify Risks

3.4.1 Identification of risks by examining project data and constraints is the process of transforming

uncertainties about a project into distinct (tangible) risks that can be described and measured. The goal of risk identification activities is to search for and locate risks before they become major problems. Risk identification is a continuous process because new risks can be identified throughout the project's lifecycle. Some of the methods that can be used to identify risks are the expert interviews, brainstorming, searching lessons learned, failure modes and effects, analysis, fault tree analysis, systematic analysis of work breakdown structure levels, and comparison of project goals with plans. Key project areas to assess are requirements, technology used, management, engineering, manufacturing, supportability (logistics and maintainability), operations, safety, and programmatic aspects. Sources of information on risks include metrics, historical data, resources used, suppliers used, plans, proposed changes, test results, and project personnel.

3.4.2 Identifying risks involves two activities: capturing a statement of risk and capturing the context. Capturing a statement of a risk involves considering and recording condition that is causing concern for a potential loss to the project, followed by a brief description of the potential consequences of this condition. The format of a risk statement is: Given the [condition that is causing anxiety]; there is a possibility that {consequence} will occur.

3.4.3 The second activity involves documenting additional information regarding the circumstances, events, and interrelationships within the project that may affect the risk. The additional information about the risk ensures that the original intent of the risk can be easily understood by other personnel, particularly after time has passed.

3.5 Analyze Risks

3.5.1 The primary function of analyze is examining the risks in detail to determine the extent of the risks, how they relate to each other, and which ones are the most important. During analyze, the risk data are converted into decision-making information. Risks are evaluated by assessing the likelihood of the risk events occurring as well as the consequences of the risk occurrences to determine the relative importance. The consequences of risk occurrence include cost, schedule, performance, and safety impacts. The risk attributes (likelihood and consequences: cost, schedule, performance, safety) are defined by a governing risk management plan or by the project prior to identifying risks.

3.5.2 Risks are then classified or grouped based on shared characteristics to help the project understand the risks. Duplicate risks are identified and some risks can be grouped into sets to help build more cost-effective mitigation plans. Finally, risks are prioritized to determine which risks should be dealt with first when allocating resources. Prioritization of risks should be based on the criteria for what is most important to the project.

3.6 Planning

3.6.1 After the risk is identified and analyzed, it is necessary to determine what to do about the risk. Risk Planning involves translating risk information into decisions and mitigating actions (both present and future), and implement those actions. Risks are planned by those who have the knowledge, expertise, background, and resources to effectively deal with the risks. Planning answers the questions:

a. Is it my risk/my responsibility?

b. What approach can I take with this risk?

c. How much and what should I do with this risk?

3.6.2 Risks are reviewed to make sure that they are understood and clearly documented. Responsibility for the risk is then assigned. An approach for dealing with the risk is determined by the responsible person or team. Additional research may be needed, the risk could be accepted as is, it could be watched, or it could be mitigated. If the risk is mitigated, a mitigation plan is developed and ultimately implemented to minimize the risk and impacts while maximizing opportunity and value.

3.6.3 There are many constraints (e.g. project schedule limits, hard milestones, available personnel, hardware restrictions, total cost of risk impact, facility capacity and availability, risk management budget) that can affect risk planning. These will vary with each project and situation. It is important to identify these and periodically check to make sure the circumstances have not changed. Never take constraints for granted.

3.6.4 All risks cannot be planned simultaneously. Risks are planned in the order of importance, which depends on the goals and constraints of the project, managers, and individuals. However, priorities will change. When deciding what approach to take; consider what is most important to the project, which milestones are fixed or flexible, what resources are available, and if the risk fits into the overall project concerns.

3.6.5 Development of mitigation plans, accepting the risk, or recommending the transfer of the risk to a management authority (because it is out of the project's control to mitigate), are all actions to consider under the planning process. The development of mitigation plans may involve a trade study of various plans to find the best mitigation plan. The development of mitigation plans may involve contingency planning, wherein a mitigation plan is triggered in the future by some set of metric downturns in a tracked risk. The mitigation plan shall be developed to reduce, not necessarily eliminate, the likelihood of occurrence and/or the severity of the consequences. It may involve re-design, development of new prototypes, modification of the engineering requirements, augmentation of test, inspection, and analysis or finally renegotiation of the driving project requirements.

3.7 Risk Tracking

3.7.1 Tracking is a process in which risk data are acquired, compiled and reported by the person responsible for tracking watched and mitigated risks. The data are collected and the results are compiled and presented in reports that are easily understood to the person/group who receives the status report. The status reports generated during Tracking are used by project management during the control function of the paradigm to make decisions about managing risks.

3.7.2 Risks that are judged to have sufficiently severe consequences and high likelihood of occurrence shall be tracked and reevaluated periodically. (The actual time period between reviews is determined by the project, and should be generally stated in their RMP. It can also be tailored depending on individual risk severity.)

a. Those risks, which have an active mitigation plan, shall be tracked, and monitored to verify the mitigation is reducing the risks as planned.

b. Those risks, which need communication to higher levels and boards, shall be actively communicated to the appropriate level (as defined in project documentation) in a timely manner.

c. Any recommendations from these higher levels shall be carefully monitored to assure both the risk was properly understood and the suggested risk mitigation indicated was appropriate and doable with the resources given.

3.7.3 During tracking, the risk is monitored with indicators and triggers to determine if the mitigation plan is being followed and the risk severity is being reduced. Indicators provide insight into a process or improvement activity while triggers are thresholds for indicators that specify when an action such as implementing a contingency plan, may need to be taken. Triggers provide early warning of an impending critical event and that immediate action for a risk should be taken.

3.8 Risk Control

Control is the process of making informed, timely, and effective decisions regarding risks and their mitigation plans. Decisions are made by the project manager or the person who has accountability for the risk, based on current information from risk tracking as well as experience and are required to respond to changing conditions. Effective control includes execution of the planning phase, monitoring mitigation plan execution and effectiveness, assessment of risk changes and trends, determining appropriate responses, and communicating all the above information. Risk tracking and control should be integrated with standard project management practices

3.9 Communication and Documentation

3.9.1 At the core of the risk paradigm is open communication and documentation which should be present in all other functions. Successful risk management communication raises the level of understanding of relevant issues or actions within a project. The purpose of communicate and document are for project personnel to understand the project's risks and mitigation alternatives and understand the risk data and make informed choices within the constraints of the project.

3.9.2 Communication and documentation provide information and feedback to the program on risk activities, risk status, and potential new risks and ensures the documentation and visibility of risk information for better management.

3.9.3 Risk Database

a. There is no requirement for where the risks should be maintained. However, for configuration management and for promoting teamwork, the risks should be located in a database, where all have access. The Program and Project Assurance Division has developed a tool for local projects and programs called Risk Management Implementation Tool, or RMIT for short.

b. RMIT is a web-based tool that was designed to implement the NASA Continuous Risk Management Process. This tool allows a program/project to identify, analyze, plan, track, control, document, and

communicate risks in an environment tailored to their project requirements. Programs/projects can utilize RMIT as a basis for decisions on how to mitigate cost, schedule, technical, environmental, security, and safety risks. To ensure risk management begins early in the life cycle, the programs/projects can begin using RMIT during the formulation phase to identify initial risks and develop a RMP, and then continue managing risks throughout the program's/project's life cycle.

c. The RMIT is centrally located for distributed project members to use, allows the risk owner to classify or group a risk with other risks, captures lessons learned, and is compliant with 508 requirements of the Rehabilitation Act. The RMIT features a flexible reporting format such as 5 X 5 Risk Matrix and Focus Chart, Milestone Readiness, Top "N" Risks, Subsystems Affected, Days in System, Last Modified, Risk Classification, and Risks Summary Chart where project risks are listed along with their status.

3.9.4 Risk Reporting

NASA has established a standard risk reporting format to communicate risks upward to the next management level and outward to other NASA Centers or NASA enterprises. The standard NASA risk report is a 5 x 5 risk matrix along with a top risk list that identifies primary risks as well as criticality and trending of the risk attributes. A risk focus chart with detailed information about each risk is also required. Focus charts include risk identification number, risk title, risk statement, risk criticality, risk ranking, approach, current plan, and the status of the plan and the next milestone/action. As a minimum, all primary risks (red on the risk matrix) shall be reported in the format described above.

Appendix A. Definitions

A.1. Accept. The formal process of justifying and documenting a decision not to mitigate a given risk associated with achieving given objectives or given performance requirements.

A.2. Acceptable Risk. The risk that is understood and agreed to by the program/project, governing authority, mission directorate, or other customer(s) such that no further specific mitigating action is required.

A.3. Close. The determination that a risk is no longer cost-effective to track, because (for example) the associated scenario likelihoods are low (e.g., the underlying condition no longer exists), or the associated consequences are low.

A.4. Continuous Risk Management. The iterative process that identifies risk; analyzes their impact and prioritizes them; develops and carries out plans for risk mitigation or acceptance; tracks risk and the implementation of plans; supports informed, timely, and effective decisions to control risks and mitigation plans; and assures that risk information is communicated and documented.

A.5. Institutional Risks. Risks to infrastructure, information technology, resources, personnel, assets, processes, occupational safety, environmental management, or security that affect capabilities and resources necessary for mission success, including institutional flexibility to respond to changing mission needs and compliance with external requirements (e.g., Environmental Protection Agency or Occupational Safety and Health Administration regulations).

A.6. Knowledge Management. Getting the right information to the right people at the right time without delay while helping people create knowledge and share and act upon information in ways that will measurably improve the performance of NASA and its partners

A.7. Lesson Learned. The significant knowledge or understanding gained through past or current programs and projects that is documented and collected to benefit current and future programs and projects.

A.8. Likelihood. A measure of the possibility that a scenario will occur that also accounts for the timeframe in which the events represented in the scenario can occur.

A.9. Mitigate. The modification of a process, system, or activity in order to reduce a risk by reducing its probability, consequence severity, or uncertainty, or by shifting its timeframe.

A.10. Primary Risk. Those undesirable events having both high probability and high impact/severity (NPR 7120.5D)

A.11. Research. The investigation of a risk in order to acquire sufficient information to support another disposition; i.e., close, watch, mitigate, or accept.

A.12. Risk. The combination of the probability that a program or project will experience an undesired event (some examples include a cost overrun, schedule slippage, safety mishap, health problem, malicious activities, environmental impact, failure to achieve a needed scientific or technological breakthrough or mission success criteria) and the consequences, impact, or severity of the undesired event, were it to occur. Both the probability and consequences may have associated uncertainties.

A.13. Risk Board. Formally established groups of people assigned specifically to review risk information. Their output is twofold: (1) to improve the management of risk in the area being reviewed and (2) to serve as an input to decision-making bodies in need of risk information.

A.14. Risk-Informed Decision Making. A five-step process focusing first on objectives and next on developing decision alternatives with those objectives clearly in mind and/or using decision alternatives that have been developed under other systems engineering processes.

A.15. Risk Management. An organized, systematic decision making process that efficiently identifies, analyzes, plans, tracks, controls, communicates, and documents risk to increase the likelihood of achieving program/project goals.

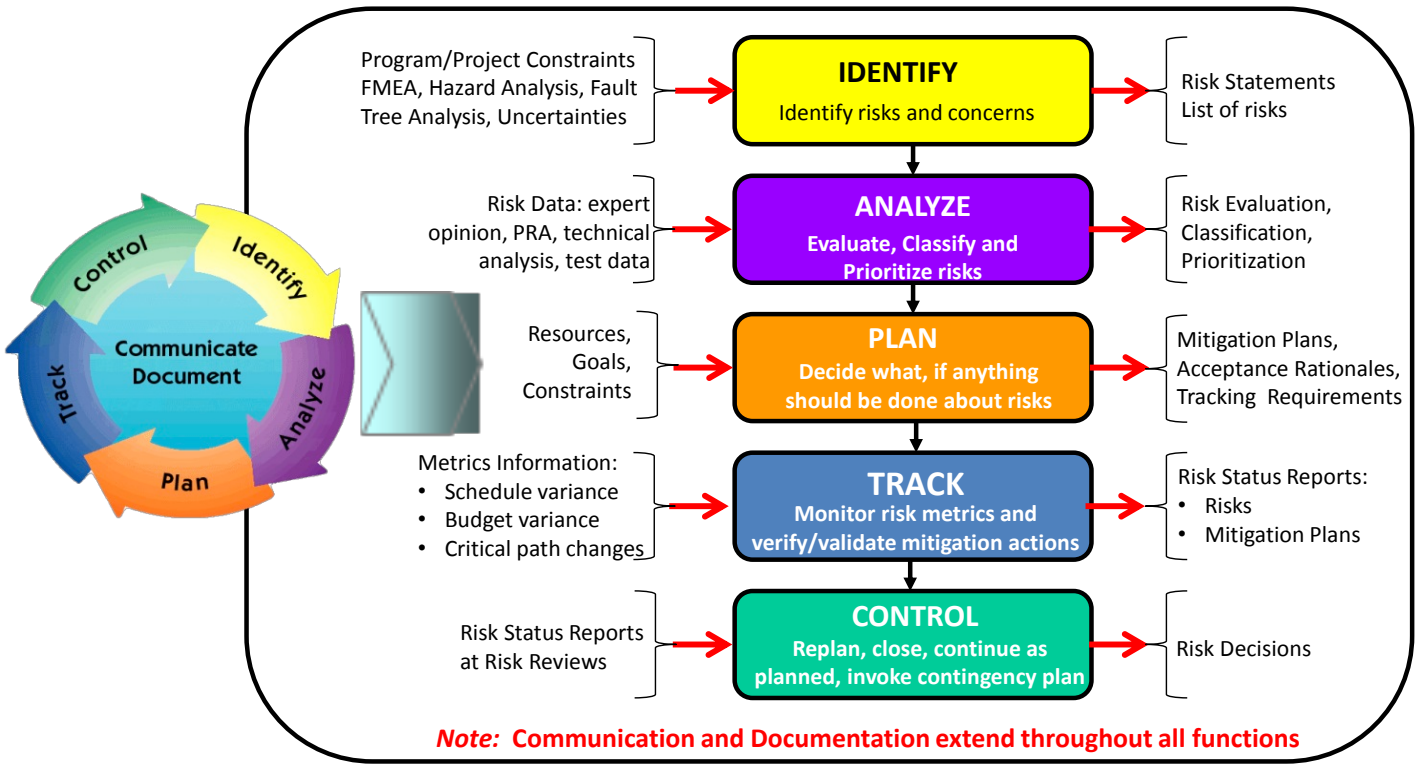
A.16. Risk Owner. The "risk owner" is the entity, usually a named individual, designated as the lead for overseeing the implementation of the agreed disposition of that risk.

A.17. Watch. The monitoring of a risk for early warning of a significant change in its probability, consequences, uncertainty, or timeframe.

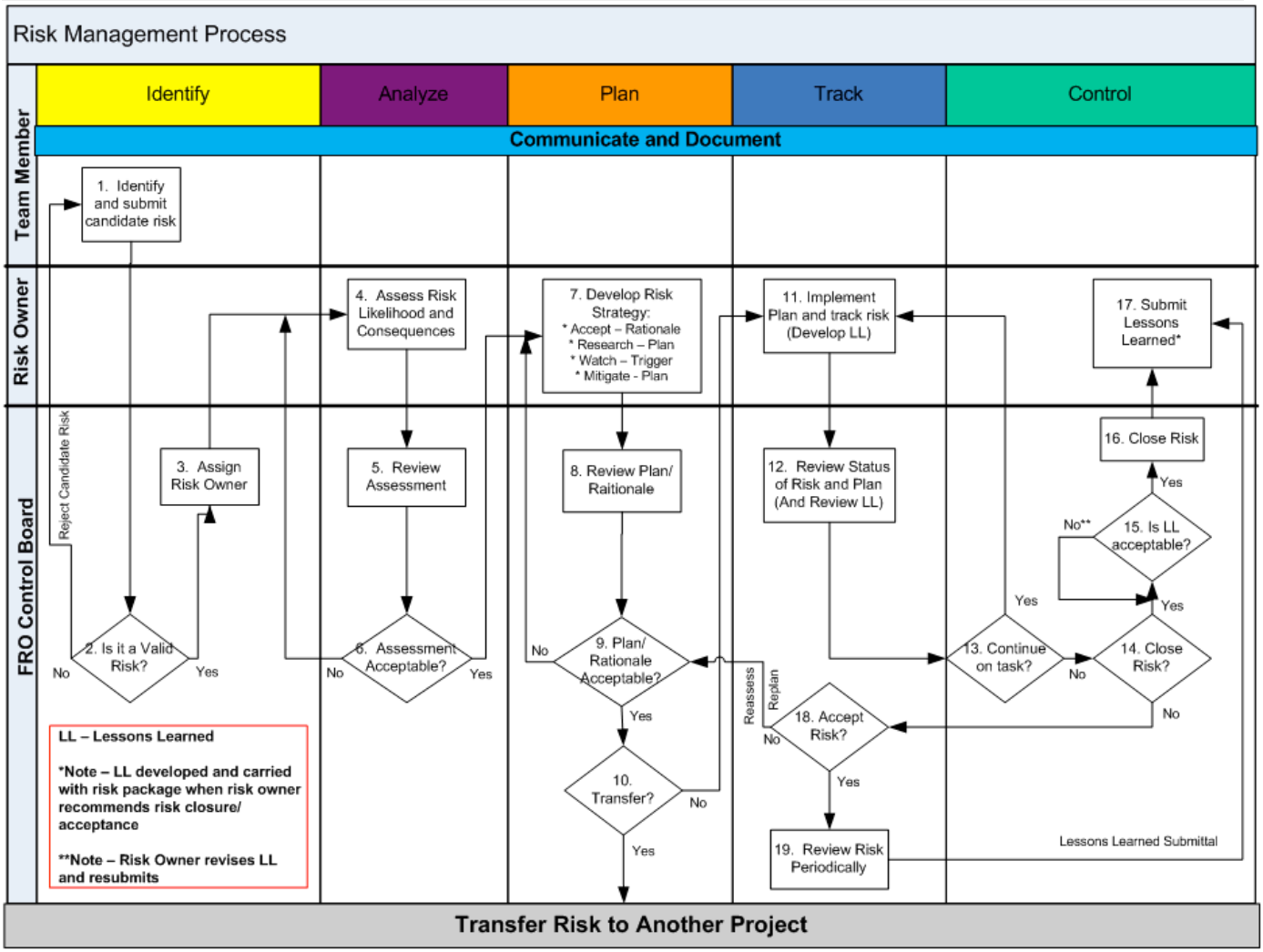
Appendix B. Acronyms

B.1	ATD	Advanced Technology Development
B.2	BMS	Business Management System Library
B.3	CoF	Construction of Facilities
B.4	CRM	Continuous Risk Management
B.5	EMC	Engineering Management Council
B.6	GLPR	Glenn Procedural Requirements
B.7	GLWI	Glenn Work Instruction
B.8	GRC	Glenn Research Center
B.9	NPD	NASA Policy Directive
B.10	NPR	NASA Procedural Requirements
B.11	OHSAS	Occupational Health and Safety Assessment Specification
B.12	PMs	Performance Measures
B.13	RIDM	Risk Informed Decision Making
B.14	RM	Risk Management
B.15	RMIT	Risk Management Implementation Tool
B.16	RMP	Risk Management Plan
B.17	SBIR	Small Business Innovation Research
B. 18	SMAD	Safety and Mission Assurance Directorate

Appendix C. Risk Management Flowchart



Appendix D. Risk Management Process Flowchart



Appendix E. References

a. AS 9100 C, “Aerospace Quality Management System Standard”

b. NASA/SP-2010-576, “NASA Risk-Informed Decision-Making Handbook”